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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/647,163	08/21/2003	Hui-Ling Lou	MP0284	1606

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MINNEAPOLIS, MN 55402

EXAMINER

NGUYEN, HANH N

ART UNIT	PAPER NUMBER
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2616

MAIL DATE	DELIVERY MODE
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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/647,163	Applicant(s) LOU ET AL.	
	Examiner Hanh Nguyen	Art Unit 2616	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on Application filed 8/21/03.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-105 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 105 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 21 August 2003 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date <u>12/27/04</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Objections

The numbering of claims is not in accordance with 37 CFR 1.126 which requires the original numbering of the claims to be preserved throughout the prosecution. When claims are canceled, the remaining claims must not be renumbered. When new claims are presented, they must be numbered consecutively beginning with the number next following the highest numbered claims previously presented (whether entered or not).

Misnumbered claims 95-97 been renumbered 94-96

Claims 16, 20, 23, 40, 44, 47, 64, 68, 71, 88, 92, 96 are objected to because of the following informalities: the value parameter H in each of these claims is not described. Therefore, the claim limitation is not defined. Appropriate correction is required.

Drawings

The drawings are objected to because figures 1B, 1C, 2 and 4 are not in a correct format. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an

application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

The disclosure is objected to because of the following informalities: applicant is suggested to delete " customer No. 23624 Express Mail Label No. EV 348187458 US" at the bottom of each claim pages 23-44 in order to avoid vague claimed limitations.

Appropriate correction is required.

Claim Rejections - 35 USC § 101

Claim 73 is rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

Regarding claim 73, the computer program is not executed by a computer processor and does not include instructions stored in a computer readable medium.

Claims 74-97, 104 and 105 are also rejected because they depend on claim 73 respectively.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Regarding claim 49, the word "means" on line 2 is preceded by the word(s) "for receiving preamble and data symbols " in an attempt to use a "means" clause to recite a claim element as a

means for performing a specified function. However, since no function is specified by the word(s) preceding "means," it is impossible to determine the equivalents of the element, as required by 35 U.S.C. 112, sixth paragraph. See *Ex parte Klumb*, 159 USPQ 694 (Bd. App. 1967).

Further, similar words "means" on lines 3, 5, 8, 10 are respectively preceded by "performing a Fourier transform..."; "deriving initial channel estimates..."; "demodulating and decoding ..."; and "updating the channel estimat..." make them impossible to determine the equivalents of the claimed element.

Claims 50-72, 102 and 103 are also rejected because they depend on claim 49 respectively.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 25 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding claim 25, it does not make sense on line 3, 4 to state that a training sequence received in a preamble since the preamble is a part of packet transmitted and received via a transmission medium.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are

such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-18, 25-42, 49-90, 73, 92, 94, 96 are rejected under 35 USC 103(a) as being unpatentable over Izumi (US Pat. 7,085,223 B2) in view of Chuang et al. (US pat. 7,099,413 B2).

In claims 1, 7, 8, 25, 31, 32, 49, 73, 79, 80, Izumi discloses a method of obtaining channel estimates comprising receiving a preamble across a channel, the preamble including a training sequence (see fig.2 & 3, col.4, lines 45-54; receiving OFDM signal comprising preamble of subcarrier signal); performing a Fourier transform of the training sequence (see fig.2, col.4, lines 53-58; FFT 16 performs performing fast fourier transform); deriving initial channel estimates in the frequency domain with the received preamble and a stored preamble (see fig.2&3; col.5, lines 23-33 and col.3, lines 4-12; channel estimator 26 compares a preamble portion of at least one subcarrier signals with a known preamble symbol prestored in memory 28); receiving data symbols across the channel (see fig.2, col.4, lines OFDM signal is received at demodulator 18); demodulating and decoding the data symbols (see fig.2, col.4, lines 55-60; demodulator 18 and decoder recovers baseband signal). Izumi does not disclose updating the channel estimate using the demodulated and decoded data symbols. Chuang et al. discloses updating the channel estimate using the demodulated and decoded data symbols (see fig.1A, col.2, lines 5-20; at receiver 140, transformed signal after being demodulated, decoded is fed back to channel estimator 165 which repeats the signal channel estimations, demodulations and decode). Therefore, it would have been obvious to one skilled in the art apply the teachings of Chuang et al. into Izumi to update the demodulated and decoded data symbol by using channel

estimation. The motivation is improve channel quality such as minimize error rate of received data symbol.

In claims 18, 42, 90, Izumi fails to disclose that the data symbol is decoded using Viterbi algorithm. Chuang et al. discloses viterbia decoder 180 (see receiver 140, fig.1).

IN claims 2, 26, 50, 74, the limitation has been disclosed in claim 1 (See Izumi, fig.2, demodulator 18 and decoder; col.4, lines 53-60).

IN claim 17, the limitation has been disclosed in claim 1 (see Chuang et al.; fig.1A).

In claims 19, 20, 21, 22, 24, 43, 45, 46, 48, 91, 93, 95, 97, Izumi does not disclose exponential update, least mean square update, Kalman update, hard decision updatel. However, using one the claimed updates is well-known in the art which would have been obvious to be used by to one skilled for updating demodulated and decoded symbol.

In claim 41, the limitation of this claim has been addressed in claim 1.

IN claims 98-105, Izumi does not explicitly disclose the channel estimation is compliant with IEEE 802.11a, IEEE 802.16a. But performing OFDM channel estimation in IEEE 802.11, 802.16a standard has been well-known in the art and the OFDM techonoly has been standardized in IEEE 802.11a in the US.

claims 5, 6, 9-16, 23, 27-30, 33-40, 51-72, 75-78, 81-89 are also rejected due to their dependency to parent claims.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Crawford (US Pat. 6650616 B2);

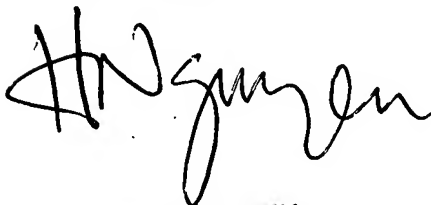
Ojard et al. (US Pat. 6,892,075 B2)

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hanh Nguyen whose telephone number is 571 272 3092. The examiner can normally be reached on Monday-Thursday from 8:30 to 4:30. The examiner can also be reached on alternate

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Lynn Field , can be reached on 571 272 2092. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Hanh Nguyen

A handwritten signature in black ink, appearing to read 'Hanh Nguyen', with a stylized, cursive script.

HANH NGUYEN
PRIMARY EXAMINER